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HEATER PEDESTAL SHEATH
[Jia Re Dai Tai zhi Hu Tao]

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4. Chinese Summary of the Invention (Title of the Invention: Heater pedestal sheath) /2*

A type of sheath of a heater pedestal, of which said heater pedestal is installed inside a processing chamber and used to support and heat wafers or substrates. Said sheath minimally covers the side or exposed surface of said heater pedestal. Because said sheath is composed of at least two layers forming a sealed vacuum cavity, it effectively isolates heat and prevents heat damage.

English Summary of the Invention (Invention name:) [blank]

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5. Description of the Invention (2) /5

[Translator's note: content starts mid-sentence] ... effectively preventing heat loss and the occurrence of an adverse reaction.

The secondary purpose of the present invention is to provide a type of heater pedestal, wherein it is used to form a vacuum heat insulating layer on at least one side to insulate from the heat, thus effectively preventing heat loss and the occurrence of an adverse reaction.

The sheath of the heater pedestal of the present invention is installed inside a processing chamber and used to support and heat wafers or substrates. Said sheath minimally covers the side or exposed surface of said heater pedestal. Because said sheath is composed of at least two layers forming a sealed vacuum cavity, it effectively isolates heat and prevents heat damage.

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*Numbers in the margin indicate pagination in the foreign text

In addition, by using the side of the heater pedestal as the inside layer of the sheath, the sheath of the present invention can also be composed as a single component with the heater pedestal.

[Description of the Invention]

Please refer to the attached diagrams to explain the following preferred embodiments of the present invention:

As shown in Figure 1 and Figure 2, an example of the first preferred embodiment of the heater pedestal sheath of the present invention. Said sheath 110 corresponds to different heater pedestals 120, thus forming an appropriate configuration. Within this example, said heater pedestal 120 is installed in a processing chamber (such as a PVD, CVD, or PECVD processing chamber). Internally it supports and heats the ceramic substrate 130. As LCD panels such as TFT LCD, TN LCD, STN LCD form a rectangular shape, said sheath 110 forms a rectangular box shape that can be easily installed with said heater pedestal 120. If said heater pedestal is used to support and heat semiconductor wafers and thus forms a disc shape, then said sheath should be a circular plate cover that can be used with the heater pedestal.

As shown in Figure 1, said sheath 110 assumes a rectangular box shape, of which comprises an inner layer 111 and outer layer 112. Of which, there is a gap between the inner layer 111 and outer layer 112 to form a

sealed vacuum cavity 113. A hole is left at the bottom section of said sheath 110 to provide a covering design with the heater pedestal 120. Because said vacuum cavity 113 causes an insulating effect between the

inner layer 111 and out layer 112, and said sheath 110 is selected for the various processes such as etching, metal layer accumulation, and dielectric and used with aluminum, stainless steel, superalloy, molybdenum, tantalum, glass, or quartz materials for production to prevent contaminates or loosening.

As shown in Figure 2, said heater pedestal 120 can be installed freely at reduced pressure in a processing chamber to support and heat a substrate 130. Of which, said heater pedestal 120 comprises a pedestal 121 to support the substrate 130, a resistance heater 122, of which a heater coil 123 is installed within said pedestal 121 to heat the substrate 130, an rod 124 to support said pedestal 121 and provide an connection between the circuit to the heater coil 123. When the aforementioned sheath 110 is installed on said heater pedestal 120, said sheath 110 covers the side and bottom section said heater pedestal 120 (minimally covering the exposed surface of the heater pedestal 120 inside the processing chamber, whereby said exposed surface means the part of said heater pedestal 120 exposed in said processing chamber even after supporting a wafer or substrate). Because the heat emitted by the heater coil 123 is separated from the side and lower section of the heater pedestal 120 by said sheath 110, it heat energy is primarily transferred to the heater pedestal 120 where it is in contact with the substrate 130. Thereby it provides a reduction of heat loss for the substrate 130 and even prevents the temperature around the heater pedestal 120 from rising too high and causing an adverse reaction.

The sheath 110 of the first preferred embodiment is a single component

and can be suited to use a typical heater pedestal 120 currently available. Then, the sheath can also be a single piece with the heating pedestal.

As shown in Figure 3, the second preferred embodiment of the

present invention, as heater pedestal 220 is installed freely at reduced pressure inside the processing chamber to support and heat the substrate 130. Of which, said heater pedestal 220 comprises a resistance heater 222. Its heater coil 223 is installed inside said pedestal 221 to heat the substrate 130, a rod 224 to support said pedestal 221 and provide a connection between the circuit and the heater coil 223, and a pedestal 221 used to support the substrate 130. Said pedestal 221 forms a vacuum heat insulating layer 225 at the side. Said vacuum heat insulating surface 225 can cover the outside lower section of the rod 224 and outer top edge at the contact point at the pedestal 221 and the substrate 130 (the outer surface of the heater pedestal 221 that is not supporting the substrate 130). Said vacuum heat insulating layer 225 is formed by being sealed between external wall 226 and the pedestal 221 body. Of which, the said external wall 226 forms an angled surface towards the center with the top edge of the outer connecting surface of the substrate 130. This ensures better positioning of the substrate 130 when placed. The aforementioned structure provides a greater surface coverage of heat insulation and conserves manufacturing materials.

In addition, the heat insulating sheath of the present invention is not limited to resistance heater pedestals. Other heating devices can be used for the heating pedestal. Examples include halogen lamp heaters,

etc.

As shown in Figure 4, the sheath of the present invention used in a different heater, being the third preferred embodiment, a heat insulating sheath 310 forms a vacuum cavity 313 through the inner layer 311 and the outer layer 312. Said sheath 310 forms a large area hollow ring sheath. It covers the sides and lower edges of the pedestal 321. The lower section of the pedestal is not covered and can support irradiation from halogen lamps 322 where the substrate 130 is heated through said pedestal 321. There are multiple designs of the halogen lamps 322 for inside the processing chamber or outside the processing chamber. Through such structure, the sheath 310 of the present invention can be used with a halogen lamp heater to heat the pedestal and prevent the sides of the pedestal 321 and thus the product from being adversely affected from high temperatures.

5. DESCRIPTION OF THE INVENTION (5) /8

As shown in Figure 5, the fourth preferred embodiment of the present invention, within the heating pedestal of the halogen lamp heater, the pedestal 421 and the sheath 410 form a single unit. The vacuum cavity 412 of the sheath 410 is formed by the sides encircling the pedestal 421 body with the inner layer 411 and outer layer 412 of the sheath 410. Of which, said vacuum cavity 412 covers the sides, top section, and lower section peripheral of the pedestal 421 so that the top section of said pedestal 421 comes in contact with and supports said substrate 130 and the lower section of the pedestal 421 is the irradiation surface for the halogen lights 422. In this way, the halogen lights 422 are able to

effectively heat the substrate 130 and high heat will not be produced around the peripheral exposed sections (the outer layer 412 of the sheath 410) of the pedestal 421.

It must be expressed that the aforementioned preferred embodiments are to describe the present invention and are not to limit the present invention. The scope of protection of the present invention can be viewed as defined in the following patent application claims. Anyone familiar in the art that makes any changes or modifications to the present invention that fall within the spirit and scope of the present invention, also fall within the scope of protection of the present invention.

[Brief Description of the Diagrams] /9

[Figure 1] A three dimensional diagram of the first preferred embodiment of the sheath of the heater pedestal of the present invention.

[Figure 2] A vertical cross sectional view of the sheath of Figure 1 installed on a heater pedestal.

[Figure 3] A vertical cross sectional view of the second preferred embodiment of the present invention being the sheath of the heater pedestal combined with the heater pedestal.

[Figure 4] A vertical cross sectional view of the third preferred embodiment of the present invention being the sheath of a different heat source with the heater pedestal.

[Figure 5] A vertical cross sectional view of the fourth preferred embodiment of the present invention being the sheath of a different heat source with the heater pedestal.

[Explanation of the Reference Numerals]

110 Sheath

111 Inner layer

112 Outer layer

113 Vacuum cavity

120 Heater pedestal

121 Pedestal

122 Resistance heater

123 Heater coil

124 Rod

130 Substrate

220 Heater pedestal

221 Pedestal

222 Resistance heater

223 Heater coil

224 Rod

225 Vacuum heat insulating layer

226 Outer wall

310 Sheath

311 Inner layer

312 Outer layer

313 Vacuum cavity

320 Heater pedestal

321 Pedestal

322 Halogen lamp heater

BRIEF DESCRIPTION OF THE DIAGRAMS /10

410 Sheath

411 Inner layer

412 Outer layer

413 Vacuum cavity

420 Heater pedestal

421 Pedestal

422 Halogen lamp heater

6. Patent Application Claims /11

[Claim 1] A type of sheath for a heater pedestal. Of which, said heater pedestal is installed in a processing chamber and supports and heats a wafer or substrate. Said sheath minimally covers the side or exposed surface of said heater pedestal. It is characterized by said sheath having a sealed vacuum cavity formed by at least two layers.

[Claim 2] A sheath as described in Claim 1 of the patent application claims, wherein said sheath covers the side and lower section of said heater pedestal.

[Claim 3] A sheath as described in Claim 2 of the patent application claims, wherein said sheath covers the outer surface of the heater pedestal that is not used to support a wafer or substrate.

[Claim 4] A sheath as described in Claim 1 of the patent application claims, wherein said sheath is manufactured from aluminum, stainless steel, superalloy, molybdenum, tantalum, glass, or quartz.

[Claim 5] A type of heater pedestal, wherein it is freely designed in a in a reaction chamber at reduced pressure and minimally comprises:

A pedestal to support the wafer or substrate, wherein said pedestal minimally form a vacuum heat insulating layer at the side or exposed surface and said pedestal is supported by a rod; and

A resistance heater, wherein it comprises being a heater coil installed within said pedestal and is used to heat said wafer or substrate.

[Claim 6] A heater pedestal as described in Claim 5 of the patent application claims, wherein said vacuum heat insulating layer is formed at the side and lower section of said heater pedestal.

[Claim 7] A heater pedestal as described in Claim 6 of the patent application claims, wherein said vacuum heat insulating layer is formed at the outer surface of said heater pedestal that does not come in contact with the wafer or substrate.

[Claim 8] A heater pedestal as described in Claim 7 of the patent application claims, wherein the outer wall of said vacuum heat insulating layer forms an angled surface toward the center at the top edge of said heater pedestal.

[Claim 9] A type of heater pedestal, wherein it is freely designed in a in a reaction chamber at reduced pressure and minimally comprises:

6. PATENT APPLICATION CLAIMS /12

A pedestal to support the wafer or substrate.

A halogen lamp heater as a light source to irradiate and head said wafer or substrate, and

A sheath, wherein it is minimally formed at the side of said pedestal and said sheath has a sealed vacuum cavity.

[Claim 10] A heater pedestal as described in Claim 9 of the patent

application claims, wherein said sheath is formed at the side and the edge of the bottom section of said pedestal.

[Claim 11] A heater pedestal as described in Claim 9 of the patent application claims, wherein said sheath is formed at the side and top section, and the edge of the bottom section of said pedestal.

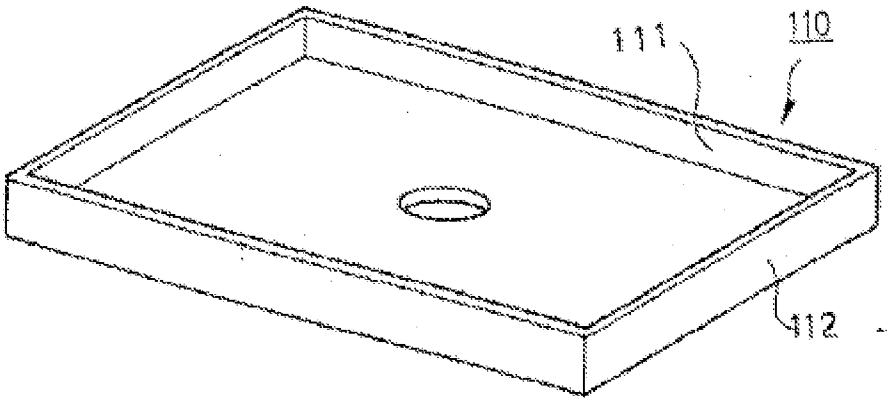
[Claim 12] A heater pedestal as described in Claim 11 of the patent application claims, wherein the outer wall of said sheath forms an angled surface towards the center at the top section of said heater pedestal.

[Claim 13] A heater pedestal as described in Claim 8 of the patent application claims, wherein said sheath is a single component, wherein the vacuum cavity is formed by at least two layers.

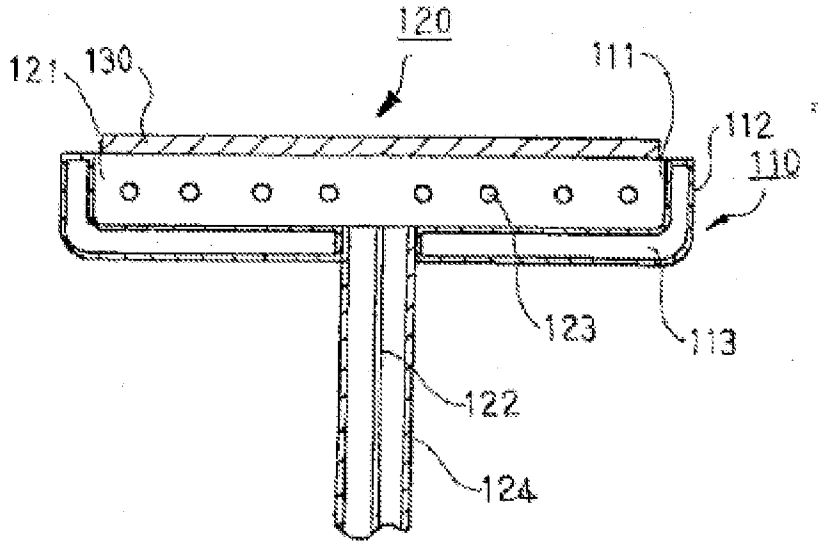
[Claim 14] A heater pedestal as described in Claim 9 of the patent application claims, wherein said heater pedestal forms a single unit with said sheath.

DIAGRAMS /1

[Figure 1]

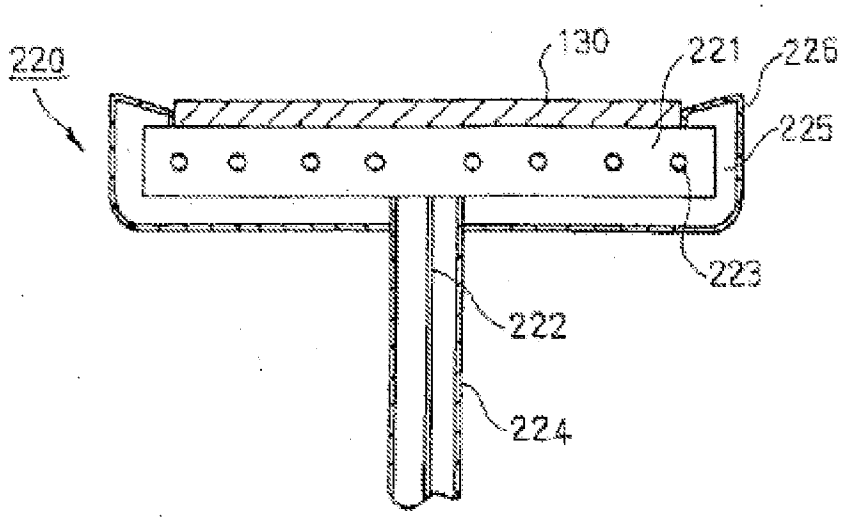


[Figure 2]

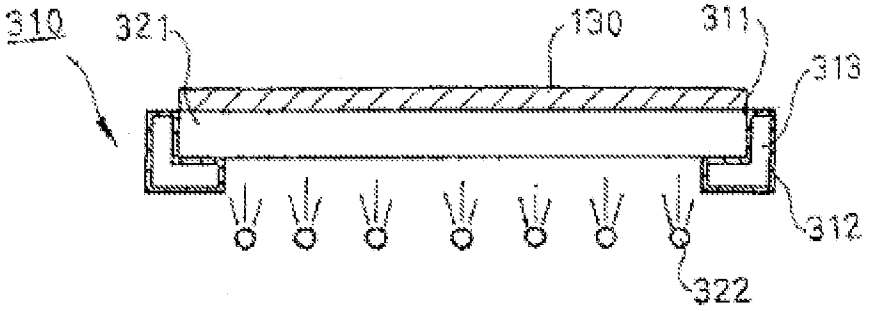


DIAGRAMS /2

[Figure 3]



[Figure 4]



[Figure 5]